

versus Core Sound. *K. brevis* was not detected in the center of Core Sound until mid November. Bogue and Back sounds were consistently found to have higher bloom concentrations than Core Sound, with particularly high levels near Bogue, Beaufort, and Barden's Inlets. *K. brevis* concentrations in Core Sound were consistently lower than in Bogue or Back sounds by a factor of ten or more. As a result, the waters of Core Sound were closed to shellfishing later and opened earlier than those of Bogue and Back sounds (Tester and Fowler 1990). *K. brevis* disappeared from Core Sound by late December, while it persisted in Bogue and Back sounds until the first week of February.

Hurricanes can cause several unfavorable environmental conditions to occur simultaneously. Rainfall associated with hurricanes can lead to reductions in salinity (also referred to as freshets) that causes mortality in bay scallops (Gutsell 1930). Tettelbach et al. (1985) documented a mass mortality of bay scallops in Long Island Sound caused by reductions in salinity following a heavy rainfall event. Mercaldo and Rhodes (1982) found that bay scallops are particularly prone to reductions in salinity at high temperatures, such as those seen in the summer and fall months during the peak of hurricane season. Hurricanes can also cause destruction of seagrass habitat required by bay scallops. Additionally, Peterson et al. (1989) proposed that storms assist in increasing mortality by transporting bay scallops into shallow, non-vegetated areas where they become susceptible to predation by gulls at low tides.

The long-term average of overall statewide landings of bay scallops during typical years was 29,732 bushels (Figure 9.7). Years were considered typical if they did not exhibit a significant change from the overall mean of the series. From 1963 to 1969, there was a temporary increase of 186% above the typical average. It is not clear what caused this increase, but appears that these may have just been particularly good years for bay scallops. Landings decreased significantly following the red tide event in 1987-88 to 61% below the typical average. A further reduction in harvest was also seen following the 1999 hurricane season dropping the average landings to 93% below the typical average. During the 1999 hurricane season, Tropical Storm Dennis saturated the ground with rainfall and was closely followed by Hurricane Floyd whose additional rainfall caused massive flooding in eastern North Carolina. Even further reduction may have also occurred as of 2004 since landings were less than 30 bushels in 2004 and zero bushels in 2005. This additional reduction could be due to Hurricane Isabel which made landfall near the northern part of Core Sound in September 2003 as a category 2 storm, predation of cownose rays on bay scallops, or a combination of these factors. It is important to note that there is no way to determine if these events actually *caused* the changes in bay scallop populations, but that these events are *coincident* with significant changes in the bay scallop time series.